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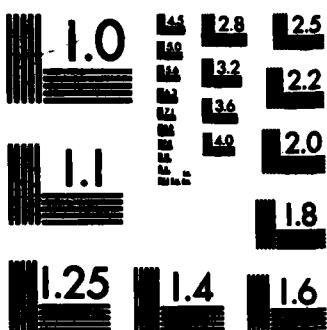
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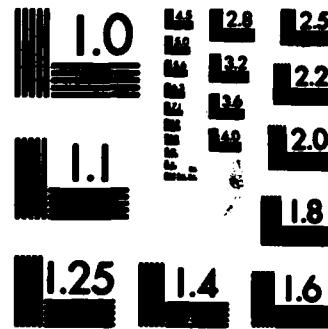
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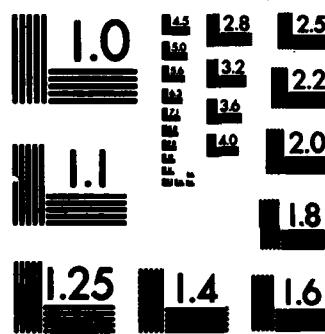
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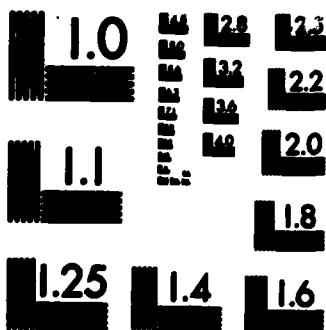
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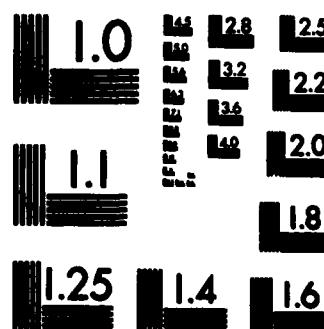
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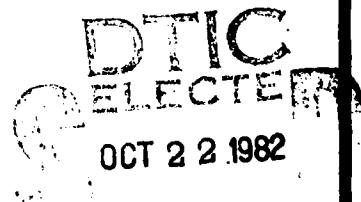
FOREIGN TECHNOLOGY DIVISION



BIST SYSTEM AND ITS USE IN GOVERNMENT

by

Czeslaw Syc



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BIST SYSTEM AND ITS USE IN GOVERNMENT

Czeslaw Syc

In accordance with directives of party and government, in respect to improving the capacity of communications, many possible variants were analyzed pertaining to the effectiveness of the telecommunications networks and existing means of information transfer, that is in the realm of "teleinformation". This is aimed at the improvement of information processing in the management of such economic areas as: transportation, communication, commerce and supply, the management of materials, energetics and agriculture; these areas have gained highest priority in the framework of economic management. /65

The results of this analysis showed that the structure of requirements of communication in these sectors of national economy is not much different from requirements for other sectors and includes 70-90% of free network transmission, that is, 50 to 200 Bd. These requirements may be satisfied within 50 Bd. by the telex network which is now a digital and completely automated system for domestic purposes. For 200 Bd. additional network may be leased. Most users of the "teleinformation" system are interested in transmission among subscribers often scattered nationwide. This happens particularly in such fields as: management of materials, trade, transportation, communication, contracting and purchasing. Only the telex network makes such transmission possible. The commutative telephone network makes automatic communication possible only within limits of larger towns. However, automatic connections are often hard to obtain. The realization of the 1977 directive "a telex in every community administration" makes automatic connection possible in every administration, that is, practically in every city. Reaching

the desired subscriber is practically instantaneous. The majority of institutions and administrative units has a telex terminal; these that do not can use the telegraph network. But, the existing tele-equipment, e.g. MERA 300 family, is misused or used ineffectively. Therefore, it was decided that the optimum utilization of this equipment should be based on telex network called BIST (basic information system telex). This system is equipped with minicomputers and proper telegraph adaptors, allowing direct connection with telex network. This system was called Intelligent Terminals or IT.

Depending on the type of minicomputer used, IT stations were named appropriately: IT-301, IT-303, IT-305 as well as IT-306; which corresponds with computers used in building stations: appropriately: MERA 301, MERA 303, MERA 305 and also MERA 306. The family of IT stations related to the MERA 300 computers is called IT-300. Each of the minicomputers of IT-300 are provided with suitable mechanisms called telegraphic adaptors, enabling direct joint operation between minicomputers and telex networks. This joint operation is realized on the basis of telex procedures dealing with reception and broadcasting telex information as well as automatic contact with desired subscribers in the network.

Telegraphic adaptors were designed and built at the District Post and Telecommunications Building in Warsaw, in individual and modular versions. The modular version may be equipped with a multiplexor enabling simultaneous to sixteen telegraphic adaptors with a one-channel minicomputer on one side. On the other side, there are interface adaptors to interface with a data minicomputer channel. According to our understanding, it is optimal for the minicomputer family MERA 300 to connect a telegraphic adaptor to minicoms MERA 301 and MERA 303, four adaptors to minicomp MERA 305, and eight to minicomp MERA 306. Each adaptor enables use of the minicomputer with one telex line. In the case of station IT-300 working as a closed circuit system, there exists the possibility of connecting minicomputer MERA 306 to four modules, each

with sixteen telegraphic adaptors. Each of the stations IT-300 may be connected to the automatic telegraph head office (exchange) on the level of the subscriber. The station may also operate locally, with teletypes connected directly to its telegraphic adaptors. There is the possibility of connecting station IT-300 to an automatic telex exchange by using telegraphic adaptors. Technical possibilities and systematic treatments by these stations exist of desired terminal apparatus of the telex network as terminal arrangement of data station IT, while maintaining all hitherto possibilities and functions, along with automatic linkage of connectors, eg: in the closed circuit process.

With the aim of linking telegraphic adaptors to different minicomputer types, the multiplexer family was worked out, enabling connection of adaptors to such minicomputers as eg: MERA 400, MERA 9150 and also DP 5500. The study includes other multiplexers, basically enabling joint operation of the telex network through standard telegraphic adaptors with the desired minicomputer type. Due to this, the user can be independent of the information equipment manufacturer. In the first stage of the BIST system, teletypes will serve the purpose of telex network sets, whereas in the next stages, teletypes can be replaced by DATATELEX, supported by minicomputers and microcomputers, electronic teletypes or portable monitors. Already in the present stage, stations IT-301, IT-303 supported by computers MERA 301 and MERA 303 are adapted to working as terminals. It is foreseen that stations IT-100 supported by the MERA 100 system will be even more useful, much less costly and more reliable in terms of the type of microprocessing technique used.

Considering the user's growing needs for telex transmission with the BIST system, the output of IT can be increased by increasing the number of telegraphic adaptors connected to a data minicomputer, which supports data station IT. Presently, station IT-064 is being designed, enabling joint operation with a telex network, and simultaneously with 64 one-track telegraphic channels.

The station can be connected to an automatic telex exchange on the subscriber level or it can operate with teletypes or terminal sets connected with it. It can also operate with mid-central connectors, providing the functions of an automatic telex exchange with the possibility of performing additional services, not possible in a traditional exchange. There exists also the possibility of cooperation with leased telegraphic connectors with speeds up to 200 Bd. All these possibilities of station IT-064 can be realized through special programs and microprograms without design changes in the stations. There exists great flexibility in adapting to different demands and operating conditions. The station can be developed modularly to eight systems with 64 telex lines each. The station may operate as a closed circuit set enabling automatic selection of a given telex network subscriber in the country. There exists the possibility of utilizing station IT-064 in the system PIAST for Regional Managements and other regional administration units. Station IT-064 can also be used for the automation of receiving and retransmission of telegrams in all larger regional cities, and also for the reception of a certain format of telex message for the users of the telex network. A station of this type can also be used for creating multi-position subscriber systems with remote access and for providing information services; eg: from the sphere of trade, purchasing and contracting, supply activity, material management, reservation of space, tourism services, transportation and banking, and PKO etc.

The main virtue of using IT is the possibility of taking advantage of the telex network for information requirements — in an organized and automatic fashion, by all users of the network.

a) Reception and broadcasting of information on formats from and to the telex network;

b) Automatic linkage of connections between desired subscribers of the telex network and terminal stations to enable sending of appropriate telex information;

- c) Transfer telex information to appropriate external installation terminals or appropriate computer processor, which transfers data for further treatment on minicomputers or computers;
- d) Transmitting telex information automatically;
- e) Simultaneous, direct introduction of information from teletypes in local system, as well as simultaneous reception and broadcasting of information, to and from telex networks, and also data transmissions using commutative telephone links and modems;
- f) Presentation of certain information on screen monitors with the possibility of proofreading and eventually directed onto the printer or appropriate computer data carrier;
- g) Writing and reading of information from paper tapes, magnetic carriers in different codes eg: Nr2, Nr5, etc.
- h) Sending telex information in a closed circuit system.

Moreover station IT-064 enables:

- a) The functioning of stations in automatic telegraphic exchange systems;
- b) Operation of stations in various codes eg: Nr2 and Nr5;
- c) Operation at various modulation speeds, eg: up to 50 and up to 200 Bd.
- d) Creation of closed groups of users, not available for other telex subscribers.
- e) Finding mistakes in transmissions without having to resort to added sets, relative to a system of control sums; multiple repetition of more important information or the using (literal) of mistakes in case of joint operation with DATATELEKS;

- f) Introduction of new types of services relative to needs;
- g) Joint operation of various types of telegraphic networks, /67
eg: direct and telex;
- h) Joint operation of various user groups;
- i) Creation and modernization of certain scattered banks.

In the BIST system, all the designed and newly designed IT stations will create a second hierarchical level of intelligent terminals among which information exchange could occur with speeds up to 1200 Bd., along commutative telephone links. The third level of the BIST system network would be determined by the larger computers associated with the three regions of management in the country. Around these exchanges there would be provincial information junctions within regional reach of a certain exchange. A giant computer would be the managing center of the whole BIST system network located in Warsaw and would enable joint operation with foreign networks and those within the country, and servicing central departments and institutions.

The concept of BIST takes into account the concept of a tele-information network. The difference is in the practical implementation of this network. In the BIST system, implementation is "from the bottom up", taking into consideration three fundamental criteria:

- timespan of implementation;
- minimization of costs;
- necessity of obtaining quick economic effects.

The BIST system does not impair the possibility of building closed computer networks (closed and branched). This introduces a competitive element, which leads to serious thought about costs and

profitability of these networks where ever they can be replaced by parts of the BIST system, or by the complete BIST system.

Utilizing the ideas of system BIST networks, it is understood /68 that the system is composed of network nodes — so-called linking nodes, as well as the paths joining these knots, called linkage channels and from the describing functions, e.g. output of the linkage channels, costs of sending information by linkage channels, distances between individual knots, etc.

Often the word network is abused, eg: network of means of computing, computer network, ZETO network, etc. The network in this idea lacks linkage channels. System BIST is a system in which the idea of a net is used appropriately.

In the program report of Professor E. Kowalczyk, announced at the conference, the idea of future teleinformation network was introduced. This network would be supported by system BIST, whose personal originator and propagator is the professor. This concept takes into account existing technical and organizational conditions, and simultaneously, in a synonymous way, describes the role and place of the telex network in the future teleinformation network. In this concept, the user of the telex network automatically becomes the user of intelligent terminals of this network, with which he can communicate with the computer to obtain indispensable information, can send appropriate information, or perform data calculations introduced with the help of his own terminal, which can be a teletype or another unit of this, connected to a telex network.

The building and development of system BIST depends on utilizing existing networks: telex and direct telegraphic networks, on equipping these networks with minicomputers provided with telegraphic adaptors and multiplexers, making possible direct joint operation of these networks with minicomputers within a realistic time span and in multi-access systems. System BIST also creates the possibility of technical joint operation of telex networks and telegraphic

networks, eg: direct networks; and it allows in a broader sphere than before the use of multiple telegraphics, which may be interesting if it means effective utilization of these networks.

System EIST is a simple and practical concept already being implemented. From the viewpoint of needs and possibilities, the most optimal solution was chosen, giving immediate results with relatively small cost investment. Every user in his own region purchases minicomputer equipment. The linkage department offers advice, planning the system, programming the system, its completion and delivery to the user. This was documented at a modest display of station IT-300 at an exhibition organized in the Post Office and Telecommunications building in Warsaw. At this exhibition, one could become familiar with functions and architecture of stations IT-301, IT-303, IT-305 and IT-306, and how these stations operate in the framework of system BIST.

Presented was also a system called MINISIK, that is MINISystem of Informing the Administration. It enables the image projection of desired information onto the screen of a television set, on the basis of questions asked by turning the dial of a telephone to a number corresponding to the question. At the exhibition, one could see how station IT-300 operates as a closed circuit system; and one could see how the DATATELEX terminal works; and also the model of a portable terminal serving as a hookup to a given television set, enabling image projection onto its screen.

B I S T

BASIC TELEX INFORMATION SYSTEM

FUNCTIONS OF SYSTEM

Commutation of information

closed circuit exchange
remote data gathering exchange
directional exchange
exchange of communication among
central data banks
center of foreign information
exchange

Commutation of news

regional information banks
communication control with Warsaw
basic information network
control of news packet dispatch

Generation of news packets

regional closed circuit
regional center for gathering data
regional dispatch center
regional information banks
regional information centers

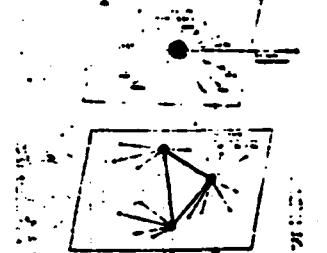
Commutation of channels:
telephone
telegraph

Automatic establishment of
connections with any subscribers of the network
sending and receiving telex

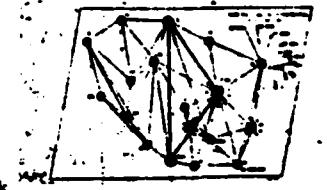
information with speed of 50 Bd
in code Nr2
direct communication
with intelligent terminals
of system BIST with the help of:
commutative links 50 Bd
statistics links
leased 200 Bd
nationwide telegraph channels

ARCHITECTURE OF SYSTEM

B



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